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A Duke Energy Company

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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

ATTENTION: Document Control Desk

Subject: Duke Energy Corporation

Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414

License Amendment Request for
Catawba Nuclear Station Technical Specifications 3.3.2, Engineered Safety Feature Actuation System Instrumentation; and 3.3.5, Loss of Power Diesel Generator Start Instrumentation

Pursuant to 10 CFR 50.90, Duke Energy Corporation is submitting a license amendment request (LAR) for the Catawba Nuclear Station Facility Operating Licenses and Technical Specifications (TS). The purpose of this LAR is to make necessary corrections, make the descriptive portion of these TSs easier to apply to plant activities, address overly restrictive requirements, and delete portions of these TSs that are not required by regulations.[1] This LAR modifies the subject TS as summarized below.

1. Adds a new MODE 3 operability requirement within Engineered Safety Feature Actuation System (ESFAS) Function 5 (Turbine Trip and Feedwater Isolation) as shown on TS Table 3.3.2-1; reformats TS Table 3.3.2-1 in regard to ESFAS Function 5; modifies identified Conditions and Required Actions applicable within ESFAS Function 5; and modifies the content and footnotes applicable to ESFAS Functions 5 and 6 (Auxiliary Feedwater).

2. Deletes ESFAS Functions 5e (Dog House Water Level- High High) and 5f (Turbine Trip and Feedwater Isolation, Trip of all Main Feedwater Pumps).

[1] 10CFR50.36, "Technical specifications."

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3. Modifies the Conditions and Required Actions for ESFAS Function 6d (Auxiliary Feedwater, Loss of Offsite Power).

4. Modifies the Conditions and Required Actions for ESFAS Function 6e (Auxiliary Feedwater, Trip of all Main Feedwater Pumps).

5. Modifies the Conditions and Required Actions for ESFAS Function 6f (Auxiliary Feedwater, Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure - Low).

6. Makes an editorial change to ESFAS Function 8 (ESFAS Interlocks, T_{avg} - Low Low, P-12).

7. Adds a new TS Surveillance Requirement (SR 3.3.2.12) for ESFAS Function 10 (Nuclear Service Water Suction Transfer- Low Pit Level).

8. Adds a note to Condition A of TS 3.3.5 which allows one channel per bus to be bypassed for surveillance testing.

Conforming changes will also be made to the Bases and are included for information.

The contents of this LAR submittal package are:

- Attachment 1 contains marked copies of the affected TS and Bases pages, showing the proposed changes.

- Attachment 2 provides reprinted pages of the affected TS and Bases pages.

- Attachments 3 provides a description of the proposed changes and technical justification.

- Pursuant to 10 CFR 50.92, Attachment 4 documents Duke's determination that this LAR contains No Significant Hazards Considerations.

- Pursuant to 10 CFR 51.22(c)(9), Attachment 5 provides the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement.

Implementation of this proposed amendment to the Catawba Facility Operating Licenses and TS will not require revision to plant's Updated Final Safety Analysis Report (UFSAR).

Duke is requesting review and approval of this LAR at the NRC's earliest opportunity. This LAR addresses a non-conservative situation that currently exists with the lack of a MODE 3 operability requirement within ESFAS Function 5 of TS 3.3.2. Also, because of the overly restrictive requirements associated with ESFAS Functions 6d, 6e, and 6f, a TS 3.0.3 unit shutdown could be required in the event of multiple channel failures on one train, even though the other train is unaffected. This is inconsistent with the general application of TS 3.0.3, which is intended to apply when the loss of all trains of a safety function is incurred. Duke has determined that the NRC's standard 30-day implementation period is acceptable for this LAR.

In accordance with Duke administrative procedures and the Quality Assurance Program Topical Report, the changes contained in this LAR have been reviewed and approved by the Catawba Plant Operations Review Committee. This LAR has also been reviewed and approved by the Duke Nuclear Safety Review Board. Pursuant to 10 CFR 50.91, a copy of this LAR is being sent to the appropriate official of the State of South Carolina.

Inquiries on this matter should be directed to J. S. Warren at (704) 382-4986.

Very truly yours,

M. S. Tuckman

Attachments

xc w/Attachments:

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M. S. Tuckman, affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

M. S. Tuckman

M. S. Tuckman, Executive Vice President

Subscribed and sworn to me: Dec 20, 2001
Date

Mary P. Nelms, Notary Public

My commission expires: JAN 22, 2006

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Attachment 1

Catawba Units 1 and 2 Technical Specifications

Marked Copy

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. One channel inoperable.	J.1 ----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip.	6 hours
	OR	
	J.2 Be in MODE 3.	12 hours
K. One Main Feedwater Pumps trip channel inoperable. on one pump or one channel inoperable on both pumps	K.1 Place channel in trip. (s)	1 hour
	OR	
	K.2 Be in MODE 3.	7 hours
L. ~~One channel inoperable.~~ Not used.	L.1 ~~----------NOTE---------- One channel may be bypassed for up to 2 hours for surveillance testing provided the other channel is OPERABLE. ----------~~ ~~Be in MODE 3.~~	~~6 hours~~

or move

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
M. One channel inoperable. (On one or both trains)	M.1 Place channel in trip. (5) OR M.2.1 Be in MODE 3. AND M.2.2 Be in MODE 4.	1 hour 7 hours 13 hours
N. One channel inoperable.	N.1 ----------NOTE---------- One additional channel may be bypassed for up to 2 hours for surveillance testing. ---------- Place channel in bypass. OR N.2.1 Be in MODE 3. AND N.2.2 Be in MODE 5.	 6 hours 12 hours 42 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
R. Two or more Nuclear Service Water Suction Transfer-Low Pit Level channels in one or more pits inoperable.	R.1 Align the Nuclear Service Water System for Standby Nuclear Service Water Pond recirculation. OR R.2.1 Be in MODE 3. AND R.2.2 Be in MODE 5.	4 hours 10 hours 40 hours

Place INSERT C1 Here

INSERT C1

Condition S:				
S.	One channel or train inoperable.	S.1	Restore channel or train to OPERABLE status.	48 hours
		OR		
		S.2	Be in MODE 3.	54 hours
Condition T:				
T.	One or more channel(s) per bus inoperable.	T.1	---------NOTE--------- One inoperable channel per bus may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	
			Enter applicable Condition(s) and Required Actions(s) of LCO 3.3.5, "LOP DG Start Instrumentation," for the inoperable channel(s).	Immediately
Condition U:				
U.	Two or more channels inoperable on one train.	U.1	Declare the associated AFW train inoperable.	Immediately

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.2.8	----------NOTE---------- Verification of setpoint not required for manual initiation functions. ---------- Perform TADOT.	18 months
SR 3.3.2.9	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months
SR 3.3.2.10	----------NOTE---------- Not required to be performed for the turbine driven AFW pump until 24 hours after SG pressure is $\geq$ 600 psig. ---------- Verify ESFAS RESPONSE TIMES are within limit.	18 months on a STAGGERED TEST BASIS
SR 3.3.2.11	Perform COT.	18 months
SR 3.3.2.12	Perform ACTUATION LOGIC TEST	18 months

Table 3.3.2-1 (page 3 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation (continued)						
(2) Negative Rate - High	3[b][c]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 122.8[d] psi	100[d] psi
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2[e]	2 trains	I	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. SG Water Level - High High (P-14)	1,2[e]	4 per SG	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. T_{avg}-Low coincident with Reactor Trip, P-4	1,2[e] Refer to Function 8.a (Reactor Trip, P-4) for all initiation functions and requirements.	4	J	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≥ 561°F	564°F
e. Doghouse Water Level - High High	1,2[e]	2 per doghouse	L	SR 3.3.2.8	≤ 12 inches above 577 ft floor level	11 inches above 577 ft floor level
f. Trip of all main feedwater pumps	1,2[a]	3 per MFW pump	K	SR 3.3.2.8	NA	NA

Replace With INSERT C2

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Except when all MSIVs are closed and de-activated.

(c) Trip function automatically blocked above P-11 (Pressurizer Pressure) interlock and may be blocked below P-11 when Steam Line Isolation Steam Line Pressure - Low is not blocked.

(d) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(e) Except when all MFWs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Place INSERT C3 Here

INSERT C2

5.	Turbine Trip and Feedwater Isolation						
	a. Turbine Trip						
	(1) Automatic Actuation Logic and Actuation Relays	$1^{(f)},2^{(f)}$	2 trains	I	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
	(2) SG Water Level-High-High (P-14)	$1^{(f)},2^{(f)}$	4 per SG	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
	(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5.a.(1) for Applicable MODES.					
	(4) Reactor Trip (P-4)	$1^{(f)},2^{(f)}$	1 per train, 2 trains	S	SR 3.3.2.8	NA	NA
	b. Feedwater Isolation						
	(1) Automatic Actuation Logic and Actuation Relays	$1,2^{(e)},3^{(e)}$	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
	(2) SG Water Level- High High (P-14)	$1,2^{(e)},3^{(e)}$	4 per SG	D	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
	(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5.b.(1) for Applicable MODES.					
	(4) Tavg-Low	$1,2^{(e)}$	4	J	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≥ 561°F	564°F
	coincident with Reactor Trip, P-4	Refer to Function 8.a (Reactor Trip, P-4) for all initiation functions and requirements.					

INSERT C3

(e) Except when either: 1) all MFIVs are closed and de-activated; or, 2) all MFCVs and associated bypass valves are closed and de-activated; or, 3) feedwater is isolated by a closed manual valve.

(f) Except when steam admission to the Main Turbine is prevented.

Table 3.3.2-1 (page 4 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. SG Water Level - Low Low	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 9% (Unit 1) ≥ 35.1% (Unit 2)	10.7% (Unit 1) 36.8% (Unit 2)
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. Loss of Offsite Power	1,2,3	3 per bus	P	SR 3.3.2.3 SR 3.3.2.9 SR 3.3.2.10	≥ 3242 V	3500 V
e. Trip of all Main Feedwater Pumps	1,2(a)	3 per pump	K	SR 3.3.2.8 SR 3.3.2.10	NA	NA
f. Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure - Low	1,2,3	3 per train	M	SR 3.3.2.8 SR 3.3.2.10	A) ≥ 9.5 psig B) ≥ 5.2 psig (Unit 1) ≥ 5.0 psig (Unit 2)	A) 10.5 psig B) 6.2 psig (Unit 1) 6.0 psig (Unit 2)
7. Automatic Switchover to Containment Sump						
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. Refueling Water Storage Tank (RWST) Level – Low	1,2,3,4	4	N	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9 SR 3.3.2.10	≥ 162.4 inches	177.15 inches
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.
If more than one channel of Auxiliary Feedwater Suction Pressure – Low for one train becomes inoperable, immediately enter the applicable Condition(s) and Required Action(s) for the associated AFW train made inoperable by the inoperable channels. This is a one time only change for Unit 1 in support of the activities associated with the replacement of pressure switch 1CAPS5232.

Table 3.3.2-1 (page 5 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
8. ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3.2.8	NA	NA
b. Pressurizer Pressure, P-11	1,2,3	3	O	SR 3.3.2.5 SR 3.3.2.9	≥ 1944 and ≤ 1966 psig	1955 psig
c. T_{avg} - Low Low, P-12	1,2,3	~~1 per loop~~ 4	O	SR 3.3.2.5 SR 3.3.2.9	≥ 550°F	553°F
9. Containment Pressure Control System						
a. Start Permissive	1,2,3,4	4 per train	P	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9	≤ 0.45 psid	0.4 psid
b. Termination	1,2,3,4	4 per train	P	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9	≥ 0.25 psid	0.3 psid
10. Nuclear Service Water Suction Transfer - Low Pit Level	1,2,3,4	3 per pit	Q,R	SR 3.3.2.1 SR 3.3.2.9 SR 3.3.2.11 SR 3.3.2.12	≥ El. 555.4 ft	El. 557.5 ft

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

(2) Steam Line Pressure-Negative Rate-High

Steam Line Pressure-Negative Rate-High provides closure of the MSIVs for an SLB when less than the P-11 setpoint, to maintain at least one unfaulted SG as a heat sink for the reactor, and to limit the mass and energy release to containment. When the operator manually blocks the Steam Line Pressure-Low main steam isolation signal when less than the P-11 setpoint, the Steam Line Pressure-Negative Rate-High signal is automatically enabled. Steam Line Pressure-Negative Rate-High provides no input to any control functions. Thus, three OPERABLE channels are sufficient to satisfy requirements with a two-out-of-three logic on each steam line.

Steam Line Pressure-Negative Rate-High must be OPERABLE in MODE 3 when less than the P-11 setpoint, when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). In MODES 1 and 2, and in MODE 3, when above the P-11 setpoint, this signal is automatically disabled and the Steam Line Pressure-Low signal is automatically enabled. The Steam Line Isolation Function is required to be OPERABLE in MODES 2 and 3 unless all MSIVs are closed and de-activated. In MODES 4, 5, and 6, there is insufficient energy in the primary and secondary sides to have an SLB or other accident that would result in a release of significant enough quantities of energy to cause a cooldown of the RCS.

Replace With INSERT C4

~~5.~~ Turbine Trip and Feedwater Isolation

~~The primary functions of the Turbine Trip and Feedwater Isolation signals are to prevent damage to the turbine due to water in the steam lines, and to stop the excessive flow of feedwater into the SGs. These Functions are necessary to mitigate the effects of a high water level in the SGs, which could result in carryover of water into the steam lines and excessive cooldown of the primary system. The SG high water level is due to excessive feedwater flows.~~

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Function is actuated when the level in any SG exceeds the high high setpoint, and performs the following functions:

- Trips the main turbine;
- Trips the MFW pumps;
- Initiates feedwater isolation; and
- Shuts the MFW regulating valves and the bypass feedwater regulating valves.

Replace With INSERT C4

Turbine Trip and Feedwater Isolation signals are both actuated by SG Water Level High High, or by an SI signal. The RTS also initiates a turbine trip signal whenever a reactor trip (P-4) is generated. Feedwater Isolation signals are also generated by a reactor trip (P-4) coincident with T_{avg}-Low and on a high water level in the reactor building doghouse. In the event of SI, the unit is taken off line and the turbine generator must be tripped. The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously.

a. Turbine Trip and Feedwater Isolation-Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

b. Turbine Trip and Feedwater Isolation-Steam Generator Water Level-High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level instruments provide input to the SG Water Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, four

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. The setpoints are based on percent of narrow range instrument span.

c. Turbine Trip and Feedwater Isolation-Safety Injection

Turbine Trip and Feedwater Isolation is also initiated by all Functions that initiate SI. The Feedwater Isolation Function requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements.

d. Turbine Trip and Feedwater Isolation - RCS T_{avg}- Low coincident with Reactor Trip (P-4)

Replace with INSERT C4

This signal only initiates a Feedwater Isolation. The signal provides protection against excessive cooldown, which could subsequently introduce a positive reactivity excursion after a plant trip. There are four channels of RCS T_{avg} - Low (one per loop), with a two-out-of-four logic required coincident with a reactor trip signal (P-4) to initiate a feedwater isolation. The P-4 interlock is discussed in Function 8.a.

e. Turbine Trip and Feedwater Isolation - Doghouse Water Level - High High

This signal initiates a Feedwater Isolation. The signal terminates forward feedwater flow in the event of a postulated pipe break in the main feedwater piping in the doghouses to prevent flooding safety related equipment essential to the safe shutdown of the plant. The level instrumentation consists of two level switches (one per train) in each of the two reactor building doghouses. A high-high level detected by one-out-of-two switches, in either the inboard or outboard doghouse, will initiate a doghouse isolation. This signal initiates Feedwater Isolation for the

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

specific doghouse where the High-High level is detected and trips both main feedwater pumps thus causing a main turbine trip.

f. Turbine Trip and Feedwater Isolation - Trip of all Main Feedwater Pumps

This signal only initiates a Turbine Trip. The signal trips the main turbine to limit the loss of steam generator water level upon a loss of normal feedwater. Three oil pressure switches are provided on each main feedwater pump trip oil system. A low pressure in two-out-of-three switches on both main feedwater pumps will initiate a turbine trip.

Turbine Trip and Feedwater Isolation Functions must be OPERABLE in MODES 1 and 2 except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve when the MFW System is in operation and the turbine generator may be in operation. In MODES 3, 4, 5, and 6, the MFW System and the turbine generator are not in service and this Function is not required to be OPERABLE.

Replace With INSERT C4

6. Auxiliary Feedwater

The AFW System is designed to provide a secondary side heat sink for the reactor in the event that the MFW System is not available. The system has two motor driven pumps and a turbine driven pump, making it available during normal and accident operation. The normal source of water for the AFW System is the condensate storage system (not safety related). A low suction pressure to the AFW pumps will automatically realign the pump suctions to the Nuclear Service Water System (NSWS)(safety related). The AFW System is aligned so that upon a pump start, flow is initiated to the respective SGs immediately.

INSERT C4 – Page 1 of 4

5. Turbine Trip and Feedwater Isolation

The primary functions of the Turbine Trip and Feedwater Isolation signals are to prevent damage to the turbine due to water in the steam lines, stop the excessive flow of feedwater into the SGs, and to limit the energy released into containment. These Functions are necessary to mitigate the effects of a high water level in the SGs, which could result in carryover of water into the steam lines and excessive cooldown of the primary system. The SG high water level is due to excessive feedwater flows. Feedwater Isolation serves to limit the energy released into containment upon a feedwater line or steam line break inside containment.

The Functions are actuated when the level in any SG exceeds the high high setpoint, and performs the following functions:

- Trips the main turbine;
- Trips the MFW pumps;
- Initiates feedwater isolation; and
- Shuts the MFW regulating valves and the bypass feedwater regulating valves.

Turbine Trip and Feedwater Isolation signals are both actuated by SG Water Level-High High, or by an SI signal. The RTS also initiates a turbine trip signal whenever a reactor trip (P-4) is generated. Feedwater Isolation signals are also generated by a reactor trip (P-4) coincident with T_{avg}-Low. The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously.

a. Turbine Trip

(1) Turbine Trip-Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

INSERT C4 – Page 2 of 4

(2) Turbine Trip-Steam Generator Water Level-High High (P-14)

This signal prevents damage to the turbine due to water in the steam lines. The ESFAS SG water level instruments provide input to the SG Water Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. The setpoints are based on percent of narrow range instrument span.

(3). Turbine Trip-Safety Injection

Turbine Trip is also initiated by all Functions that initiate SI. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements. Item 5.a.(1) is referenced for the applicable MODES.

(4) Turbine Trip - Reactor Trip (P-4)

This signal initiates a Turbine Trip. The signal trips the main turbine to limit energy removed from the primary system. The P-4 interlock is enabled when a reactor trip breaker (RTB) and its associated bypass breaker is open and is discussed further in Function 8.a.

The Turbine Trip Function must be OPERABLE in MODES 1 and 2. Turbine Trip is not required OPERABLE when steam admission to the Turbine is prevented. Acceptable means of preventing steam admission to the Turbine are by closed and gagged Stop valves, or closed and gagged Control valves, or closed and tagged MSIVs. In lower MODES, the turbine generator is not in service and this Function is not required to be OPERABLE.

INSERT C4 – Page 3 of 4

b. Feedwater Isolation

(1) Feedwater Isolation-Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

(2) Feedwater Isolation-Steam Generator Water Level-High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level instruments provide input to the SG Water Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. The setpoints are based on percent of narrow range instrument span.

(3) Feedwater Isolation-Safety Injection

Feedwater Isolation is also initiated by all Functions that initiate SI. The Feedwater Isolation Function requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements. Item 5.b.(1) is referenced for the applicable MODES.

(4) Feedwater Isolation - RCS T_{avg}- Low coincident with Reactor Trip (P-4)

This signal provides protection against excessive cooldown, which could subsequently introduce a positive reactivity excursion after a plant trip. There are four channels of RCS T_{avg} - Low (one per loop), with a two-out-of-four logic required coincident with a reactor trip signal (P-4) to initiate a feedwater isolation. The P-4 interlock is discussed in Function 8.a.

INSERT C4 – Page 4 of 4

The Feedwater Isolation Function must be OPERABLE in MODES 1 and 2 and also in MODE 3 (except for the functions listed in Table 3.3.2-1). Feedwater Isolation is not required OPERABLE when either: 1) all MFIVs are closed and de-activated; or, 2) all MFCVs and associated bypass valves are closed and de-activated; or, 3) feedwater is isolated by a closed manual valve. In lower MODES, the MFW System is not in service and this Function is not required to be OPERABLE.

SES

ABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

d. Auxiliary Feedwater-Loss of Offsite Power

A loss of offsite power to the service buses will be accompanied by a loss of reactor coolant pumping power and the subsequent need for some method of decay heat removal. The loss of offsite power is detected by a voltage drop on each essential service bus. Loss of power to either essential service bus will start the turbine driven and motor driven AFW pumps to ensure that at least one SG contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip.

Functions 6.a through 6.d must be OPERABLE in MODES 1, 2, and 3 to ensure that the SGs remain the heat sink for the reactor. These Functions do not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW actuation does not need to be OPERABLE because either AFW or residual heat removal (RHR) will already be in operation to remove decay heat or sufficient time is available to manually place either system in operation.

e. Auxiliary Feedwater-Trip of All Main Feedwater Pumps

A Trip of all MFW pumps is an indication of a loss of MFW and the subsequent need for some method of decay heat and sensible heat removal to bring the reactor back to no load temperature and pressure. Each turbine driven MFW pump is equipped with three pressure switches on the trip oil system. A low pressure signal from two-out-of-three of these pressure switches indicates a trip of that pump. Three OPERABLE channels per pump satisfy redundancy requirements with two-out-of-three logic. A trip of all MFW pumps starts the motor driven AFW pumps to ensure that at least one SG is available with water to act as the heat sink for the reactor. This function must be OPERABLE in MODES 1 and 2. This ensures that at least one SG is provided with water to serve as the heat sink to remove reactor decay heat and sensible heat in the event of an

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

accident. In MODES 3, 4, and 5, the MFW pumps may be normally shut down, and thus neither pump trip is indicative of a condition requiring automatic AFW initiation.

f. Auxiliary Feedwater-Pump Suction Transfer on Suction Pressure-Low

A low pressure signal in the AFW pump suction line protects the AFW pumps against a loss of the normal supply of water for the pumps, the condensate storage system. Three pressure switches per train are located on the AFW pump suction line from the condensate storage system. A low pressure signal sensed by two-out-of-three switches will align their train related motor driven AFW pump and the turbine driven AFW pump to the assured water supply (NSWS). The NSWS (safety grade) is then lined up to supply the AFW pumps to ensure an adequate supply of water for the AFW System to maintain at least one of the SGs as the heat sink for reactor decay heat and sensible heat removal.

two

This Function must be OPERABLE in MODES 1, 2, and 3 to ensure a safety grade supply of water for the AFW System to maintain the SGs as the heat sink for the reactor. This Function does not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW automatic suction transfer does not need to be OPERABLE because RHR will already be in operation, or sufficient time is available to place RHR in operation, to remove decay heat.

7. Automatic Switchover to Containment Sump

At the end of the injection phase of a LOCA, the RWST will be nearly empty. Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sump. The low head residual heat removal (RHR) pumps and containment spray pumps draw the water from the containment recirculation sump, the RHR pumps pump the water through the RHR heat exchanger, inject the water back into the RCS, and supply the cooled water to the other ECCS pumps. Switchover from the

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

RWST to the containment sump must occur before the RWST empties to prevent damage to the RHR pumps and a loss of core cooling capability.

a. Automatic Switchover to Containment Sump-Automatic Actuation Logic and Actuation Relays

Automatic actuation logic and actuation relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

b. Automatic Switchover to Containment Sump-Refueling Water Storage Tank (RWST) Level-Low Coincident With Safety Injection

During the injection phase of a LOCA, the RWST is the source of water for all ECCS pumps. A low level in the RWST coincident with an SI signal provides protection against a loss of water for the ECCS pumps and indicates the end of the injection phase of the LOCA. The RWST is equipped with four level transmitters. These transmitters provide no control functions. Therefore, a two-out-of-four logic is adequate to initiate the protection function actuation. Although only three channels would be sufficient, a fourth channel has been added for increased reliability.

Replace with INSERT C 5

Automatic switchover occurs only if the RWST low level signal is coincident with SI. This prevents accidental switchover during normal operation. Accidental switchover could damage ECCS pumps if they are attempting to take suction from an empty sump. The automatic switchover Function requirements for the SI Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating Functions and requirements.

INSERT C5:

Since an inadvertent switchover to the containment sump could have a significant safety impact, this instrumentation is placed in a bypass condition for testing. Therefore, four channels are supplied such that, during testing, the remaining three channels could perform the intended function, and no single failure could result in either a failure to accomplish the intended function, or in an inadvertent switchover to the containment sump.

ACTIONS (continued)

- Phase B Isolation; and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (12 hours total time) and in MODE 5 within an additional 30 hours (42 hours total time). The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. The Required Actions are not required to be met during this time, unless the train is discovered inoperable during the testing. This allowance is based on the reliability analysis assumption of WCAP-10271-P-A (Ref. 7) that 4 hours is the average time required to perform channel surveillance.

D.1, D.2.1, and D.2.2

Condition D applies to:

- Containment Pressure-High;
- Pressurizer Pressure-Low;
- Steam Line Pressure-Low;
- Steam Line Pressure-Negative Rate-High;
- ~~Loss of offsite power; and~~
- SG Water level—Low Low; and
- SG Water level—High High (P-14) for the Feedwater Isolation Function.

ACTIONS (continued)

Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1 and G.2

Condition G applies to manual initiation of Steam Line Isolation.

This action addresses the operability of the manual steam line isolation function for each individual main steam isolation valve. If a channel is inoperable, 48 hours is allowed to return it to an OPERABLE status. If the train cannot be restored to OPERABLE status, the Conditions and Required Actions of LCO 3.7.2, "Main Steam Isolation Valves," must be entered for the associated inoperable valve. The specified Completion Time is reasonable considering that there is a system level manual initiation train for this Function and the low probability of an event occurring during this interval.

, Feedwater Isolation,

H.1, H.2.1 and H.2.2

Condition H applies to the automatic actuation logic and actuation relays for the Steam Line Isolation and AFW actuation Functions.

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly

ACTIONS (continued)

manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

I.1 and I.2

Condition I applies to the automatic actuation logic and actuation relays for the Turbine Trip and Feedwater Isolation Function.

This action addresses the train orientation of the SSPS and the master and slave relays for this Function. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the following 6 hours. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. These Functions are no longer required in MODE 3. Placing the unit in MODE 3 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

BASES

ACTIONS (continued)

for the Turbine Trip Function

J.1 and J.2

Condition J applies to:

- SG Water Level—High High (P-14); and
- T_{avg}-Low.

If one channel is inoperable, 6 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-three logic will result in actuation. The 6 hour Completion Time is justified in Reference 7. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 7.

K.1 and K.2

Condition K applies to the Turbine Trip and AFW pump start on trip of all MFW pumps.

This action addresses the auto start function of the AFW System and Turbine Trip function on loss of all MFW pumps. The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. If a channel is inoperable, 1 hour is allowed to return it to an OPERABLE status or to place the channel in trip. If the function cannot be returned to an OPERABLE status or placed in a trip condition, 6 hours are allowed to place the unit in MODE 3. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

one or more channels are inoperable on one pump or one channel is inoperable on both pumps

(5)

the channel(s)

ACTIONS (continued)

L.1

Not used.

Condition L applies to the Doghouse Water Level - High High.

The failure of one channel in either reactor building doghouse results in a loss of redundancy for the function and possible feedwater isolation (depending on the failed status of the channel). This requires the unit be placed in MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, this Function is no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 2 hours for surveillance testing of other channels.

M.1, M.2.1 and M.2.2

on one or both trains

Condition M applies to the Auxiliary Feedwater Pumps Suction Transfer on Suction Pressure Low.

If one channel is inoperable, 1 hour is allowed to restore the channel to OPERABLE status or to place it in the tripped condition. The failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-~~three~~ two configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 1 hour requires the unit to be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, this Function is no longer required OPERABLE.

ACTIONS (continued)

failed channel must either be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements, or the NSWS realigned to fulfill the safety function.

Failure to place the channel in the tripped condition or to realign the NSWS suction and discharge within 4 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 5 within the next 30 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, this Function is no longer required OPERABLE.

R.1, R.2.1, and R.2.2

With two or more channels of NSWS Suction Transfer - Low Pit Level inoperable in one or more pits, the NSWS must be aligned to the Standby NSWS Pond within 4 hours. Failure to accomplish the realignment within 4 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 5 within the next 30 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, this Function is no longer required OPERABLE.

SURVEILLANCE REQUIREMENTS

The SRs for each ESFAS Function are identified by the SRs column of Table 3.3.2-1.

A Note has been added to the SR Table to clarify that Table 3.3.2-1 determines which SRs apply to which ESFAS Functions.

Note that each channel of process protection supplies both trains of the ESFAS. When testing channel I, train A and train B must be examined. Similarly, train A and train B must be examined when testing channel II, channel III, and channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

INSERT C6 - Page 1 of 2

S.1 and S.2

Condition S applies to:

- Reactor Trip (P-4).

If one train is inoperable, 48 hours are allowed to restore it to OPERABLE status. The specified Completion Time is reasonable considering the nature of this Function and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 3 and lower MODES, the turbine generator is not in service and this Function is not required to be OPERABLE.

T.1

Condition T applies to the AFW loss of offsite power Function.

If one or more channels per bus are inoperable, Required Action T.1 requires immediately entering the applicable Conditions and Required Actions of LCO 3.3.5, "Loss of Power Diesel Generator Start Instrumentation," for the inoperable channel(s). It is appropriate to enter LCO 3.3.5, since the applicable relays for Function 6.d are physically the same relays that start the diesel generators.

Required Action T.1 is modified by a Note that allows one inoperable channel per bus to be bypassed for up to 4 hours for surveillance testing of other channels. The 4 hours allowed for testing is justified based upon industry experience.

INSERT C6 - Page 2 of 2

U.1

Condition U applies when two or more channels on one train are inoperable.

Required Action U.1 requires immediately declaring the associated AFW train inoperable. This is necessary since with two or more instrumentation channels inoperable, the instrumentation train is no longer able to perform its required actuation function. With the associated AFW train declared inoperable, LCO 3.7.5, "Auxiliary Feedwater Syatem," provides the appropriate remedial actions.

SURVEILLANCE REQUIREMENTS (continued)

ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 600 psig in the SGs.

SR 3.3.2.11

SR 3.3.2.11 is the performance of a COT on the NSWS Suction Transfer - Low Pit Level.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1. This test is performed every 18 months. The Frequency is adequate based on operating experience.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 7.
3. UFSAR, Chapter 15.
4. IEEE-279-1971.
5. 10 CFR 50.49.
6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
7. WCAP-10271-P-A, Supplement 1 and Supplement 2, Rev. 1, May 1986 and June 1990.

Place INSERT C1 Here

INSERT C7:

SR 3.3.2.12

SR 3.3.2.12 is the performance of an ACTUATION LOGIC TEST on the NSWS Suction Transfer-Emergency Low Pit Level.

An ACTUATION LOGIC TEST to satisfy the requirements of GL 96-01 is performed on each NSWS Pit Suction Transfer instrumentation to ensure all combinations will initiate a transfer to the SNSWP. This test is performed every 18 months. The Frequency is adequate based on operating experience.

3.3 INSTRUMENTATION

3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

LCO 3.3.5 Three channels per bus of the loss of voltage Function and three channels per bus of the degraded voltage Function shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources — Shutdown."

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel per bus inoperable.	A.1 Place channel in trip.	6 hours
B. One or more Functions with two or more channels per bus inoperable.	B.1 Restore all but one channel to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.	Immediately

---------NOTE---------
One inoperable channel per bus may be bypassed for up to 4 hours for surveillance testing of other channels.

BASES

APPLICABILITY

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an LOP or degraded power to the vital bus.

ACTIONS

A channel shall be OPERABLE if the point at which the channel trips is found more conservative than the Allowable Value. In the event a channel's trip setpoint is found less conservative than the Allowable Value, or the transmitter, instrument loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. If plant conditions warrant, the trip setpoint may be set outside the NOMINAL TRIP SETPOINT calibration tolerance band as long as the trip setpoint is conservative with respect to the NOMINAL TRIP SETPOINT. If the trip setpoint is found outside of the NOMINAL TRIP SETPOINT calibration tolerance band and non-conservative with respect to the NOMINAL TRIP SETPOINT, the setpoint shall be re-adjusted.

Because the required channels are specified on a per bus basis, the Condition may be entered separately for each bus as appropriate.

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in the LCO. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

The required action is modified by a note that allows one inoperable channel per bus to be bypassed for up to 4 hours for surveillance testing of other channels.

A.1

Condition A applies to the LOP DG start Function with one loss of voltage or degraded voltage channel per bus inoperable.

If one channel is inoperable, Required Action A.1 requires that channel to be placed in trip within 6 hours. With a channel in trip, the LOP DG start instrumentation channels are configured to provide a one-out-of-two logic to initiate a trip of the incoming offsite power.

The specified Completion Time is reasonable considering the Function remains fully OPERABLE on every bus and the low probability of an event occurring during these intervals.

Attachment 2

Catawba Units 1 and 2 Technical Specifications

Reprinted Pages

Remove	Insert
3.3.2-5	3.3.2-5
3.3.2-6	3.3.2-6
3.3.2-8	3.3.2-8
3.3.2-10	3.3.2-10
3.3.2-13	3.3.2-13
3.3.2-14	3.3.2-14
3.3.2-15	3.3.2-15
B3.3.2-19 thru B3.3.2-30	B3.3.2-19 thru B3.3.2-30
B3.3.2-33	B3.3.2-33
B3.3.2-36 thru B3.3.2-47	B3.3.2-36 thru B3.3.2-48
3.3.5-1	3.3.5-1
B3.3.5-4	B3.3.5-4

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. One channel inoperable.	J.1 ----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip.	6 hours
	OR	
	J.2 Be in MODE 3.	12 hours
K. One or more Main Feedwater Pumps trip channels inoperable on one pump or one channel inoperable on both pumps.	K.1 Place channel(s) in trip.	1 hour
	OR	
	K.2 Be in MODE 3.	7 hours
L. Not Used.		

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
M. One channel inoperable on one or both trains.	M.1 Place channel(s) in trip. OR M.2.1 Be in MODE 3. AND M.2.2 Be in MODE 4.	1 hour 7 hours 13 hours
N. One channel inoperable.	N.1 ----------NOTE---------- One additional channel may be bypassed for up to 2 hours for surveillance testing. ---------- Place channel in bypass. OR N.2.1 Be in MODE 3. AND N.2.2 Be in MODE 5.	 6 hours 12 hours 42 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
R. Two or more Nuclear Service Water Suction Transfer-Low Pit Level channels in one or more pits inoperable.	R.1 Align the Nuclear Service Water System for Standby Nuclear Service Water Pond recirculation. OR R.2.1 Be in MODE 3. AND R.2.2 Be in MODE 5.	4 hours 10 hours 40 hours
S. One channel or train inoperable.	S.1 Restore channel or train to OPERABLE status. OR S.2 Be in MODE 3.	48 hours 54 hours
T. One or more channels per bus inoperable.	T.1 ----------NOTE---------- One inoperable channel per bus may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Enter applicable Condition(s) and Required Action(s) of LCO 3.3.5, "LOP DG Start Instrumentation," for the inoperable channel(s).	 Immediately
U. Two or more channels inoperable on one train.	U.1 Declare the associated AFW train inoperable.	Immediately

SURVEILLANCE		FREQUENCY
SR 3.3.2.8	----------NOTE---------- Verification of setpoint not required for manual initiation functions. ---------- Perform TADOT.	18 months
SR 3.3.2.9	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months
SR 3.3.2.10	----------NOTE---------- Not required to be performed for the turbine driven AFW pump until 24 hours after SG pressure is $\geq$ 600 psig. ---------- Verify ESFAS RESPONSE TIMES are within limit.	18 months on a STAGGERED TEST BASIS
SR 3.3.2.11	Perform COT.	18 months
SR 3.3.2.12	Perform ACTUATION LOGIC TEST.	18 months

Table 3.3.2-1 (page 3 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation (continued)						
(2) Negative Rate - High	3[b][c]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 122.8[d] psi	100[d] psi
5. Turbine Trip and Feedwater Isolation						
a. Turbine Trip						
(1) Automatic Actuation Logic and Actuation Relays	1[f],2[f]	2 trains	I	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
(2) SG Water Level-High-High (P-14)	1[f],2[f]	4 per SG	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5.a.(1) for Applicable MODES.					
(4) Reactor Trip (P-4)	1[f],2[f]	1 per train, 2 trains	S	SR 3.3.2.8	NA	NA
b. Feedwater Isolation						
(1) Automatic Actuation Logic and Actuation Relays	1,2[e],3[e]	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA

(continued)

(b) Except when all MSIVs are closed and de-activated.

(c) Trip function automatically blocked above P-11 (Pressurizer Pressure) interlock and may be blocked below P-11 when Steam Line Isolation Steam Line Pressure - Low is not blocked.

(d) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(e) Except when either: 1) all MFIVs are closed and de-activated; or, 2) all MFCVs and associated bypass valves are closed and de-activated; or, 3) feedwater is isolated by a closed manual valve.

(f) Except when steam admission to the Main Turbine is prevented.

Table 3.3.2-1 (page 4 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
(2) SG Water Level- High High (P-14)	1,2[e],3[e]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5.b.(1) for Applicable MODES.					
(4) Tavg-Low	1,2[e]	4	J	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≥ 561°F	564°F
coincident with Reactor Trip, P-4	Refer to Function 8.a (Reactor Trip, P-4) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. SG Water Level - Low Low	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 9% (Unit 1) ≥ 35.1% (Unit 2)	10.7% (Unit 1) 36.8% (Unit 2)
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. Loss of Offsite Power	1,2,3	3 per bus	T	SR 3.3.2.3 SR 3.3.2.9 SR 3.3.2.10	≥ 3242 V	3500 V
e. Trip of all Main Feedwater Pumps	1,2	3 per pump	K	SR 3.3.2.8 SR 3.3.2.10	NA	NA
f. Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure - Low	1,2,3	3 per train	M, U	SR 3.3.2.8 SR 3.3.2.10	A) ≥ 9.5 psig B) ≥ 5.2 psig (Unit 1) ≥ 5.0 psig (Unit 2)	A) 10.5 psig B) 6.2 psig (Unit 1) 6.0 psig (Unit 2)

(continued)

(e) Except when either: 1) all MFIVs are closed and de-activated; or, 2) all MFCVs and associated bypass valves are closed and de-activated; or, 3) feedwater is isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
7. Automatic Switchover to Containment Sump						
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. Refueling Water Storage Tank (RWST) Level – Low	1,2,3,4	4	N	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9 SR 3.3.2.10	≥ 162.4 inches	177.15 inches
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
8. ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3.2.8	NA	NA
b. Pressurizer Pressure, P-11	1,2,3	3	O	SR 3.3.2.5 SR 3.3.2.9	≥ 1944 and ≤ 1966 psig	1955 psig
c. T_{avg} - Low Low, P-12	1,2,3	4	O	SR 3.3.2.5 SR 3.3.2.9	≥ 550°F	553°F
9. Containment Pressure Control System						
a. Start Permissive	1,2,3,4	4 per train	P	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9	≤ 0.45 psid	0.4 psid
b. Termination	1,2,3,4	4 per train	P	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9	≥ 0.25 psid	0.3 psid
10. Nuclear Service Water Suction Transfer - Low Pit Level	1,2,3,4	3 per pit	Q,R	SR 3.3.2.1 SR 3.3.2.9 SR 3.3.2.11 SR 3.3.2.12	≥ El. 555.4 ft	El. 557.5 ft

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

(2) Steam Line Pressure-Negative Rate-High

Steam Line Pressure-Negative Rate-High provides closure of the MSIVs for an SLB when less than the P-11 setpoint, to maintain at least one unfaulted SG as a heat sink for the reactor, and to limit the mass and energy release to containment. When the operator manually blocks the Steam Line Pressure-Low main steam isolation signal when less than the P-11 setpoint, the Steam Line Pressure-Negative Rate-High signal is automatically enabled. Steam Line Pressure-Negative Rate-High provides no input to any control functions. Thus, three OPERABLE channels are sufficient to satisfy requirements with a two-out-of-three logic on each steam line.

Steam Line Pressure-Negative Rate-High must be OPERABLE in MODE 3 when less than the P-11 setpoint, when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). In MODES 1 and 2, and in MODE 3, when above the P-11 setpoint, this signal is automatically disabled and the Steam Line Pressure-Low signal is automatically enabled. The Steam Line Isolation Function is required to be OPERABLE in MODES 2 and 3 unless all MSIVs are closed and de-activated. In MODES 4, 5, and 6, there is insufficient energy in the primary and secondary sides to have an SLB or other accident that would result in a release of significant enough quantities of energy to cause a cooldown of the RCS.

5. Turbine Trip and Feedwater Isolation

The primary functions of the Turbine Trip and Feedwater Isolation signals are to prevent damage to the turbine due to water in the steam lines, stop the excessive flow of feedwater into the SGs, and to limit the energy released into containment. These Functions are necessary to mitigate the effects of a high water level in the SGs, which could result in carryover of water into the steam lines and excessive cooldown of the primary system. The SG high water level is due to excessive feedwater flows. Feedwater Isolation serves to limit the energy released into containment upon a feedwater line or steam line break inside containment.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Functions are actuated when the level in any SG exceeds the high high setpoint, and performs the following functions:

- Trips the main turbine;
- Trips the MFW pumps;
- Initiates feedwater isolation; and
- Shuts the MFW regulating valves and the bypass feedwater regulating valves.

Turbine Trip and Feedwater Isolation signals are both actuated by SG Water Level-High High, or by an SI signal. The RTS also initiates a turbine trip signal whenever a reactor trip (P-4) is generated. A Feedwater Isolation signal is also generated by a reactor trip (P-4) coincident with T_{avg}-Low. The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously.

a. Turbine Trip

(1) Turbine Trip-Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

(2) Turbine Trip-Steam Generator Water Level-High High (P-14)

This signal prevents damage to the turbine due to water in the steam lines. The ESFAS SG water level instruments provide input to the SG Water Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. The setpoints are based on percent of narrow range

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

instrument span.

(3) Turbine Trip-Safety Injection

Turbine Trip is also initiated by all Functions that initiate SI. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements. Item 5.a.(1) is referenced for the applicable MODES.

(4) Turbine Trip - Reactor Trip (P-4)

This signal initiates a Turbine Trip. The signal trips the main turbine to limit energy removed from the primary system. The P-4 interlock is enabled when a reactor trip breaker (RTB) and its associated bypass breaker is open and is discussed further in Function 8.a.

The Turbine Trip Function must be OPERABLE in MODES 1 and 2. Turbine Trip is not required OPERABLE when steam admission to the Turbine is prevented. Acceptable means of preventing steam admission to the Turbine are by closed and gagged Stop valves, or closed and gagged Control valves, or closed and tagged MSIVs. In lower MODES, the turbine generator is not in service and this Function is not required to be OPERABLE.

b. Feedwater Isolation

(1) Feedwater Isolation-Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

(2) Feedwater Isolation-Steam Generator Water Level-High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level instruments provide input to the SG Water Level

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. The setpoints are based on percent of narrow range instrument span.

(3) Feedwater Isolation-Safety Injection

Feedwater Isolation is also initiated by all Functions that initiate SI. The Feedwater Isolation Function requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements. Item 5.b.(1) is referenced for the applicable MODES.

(4) Feedwater Isolation - RCS T_{avg}- Low coincident with Reactor Trip (P-4)

This signal provides protection against excessive cooldown, which could subsequently introduce a positive reactivity excursion after a plant trip. There are four channels of RCS T_{avg} - Low (one per loop), with a two-out-of-four logic required coincident with a reactor trip signal (P-4) to initiate a feedwater isolation. The P-4 interlock is discussed in Function 8.a.

The Feedwater Isolation Function must be OPERABLE in MODES 1 and 2 and also in MODE 3 (except for the functions listed in Table 3.3.2-1). Feedwater Isolation is not required OPERABLE when either: 1) all MFIVs are closed and de-activated; or, 2) all MFCVs and associated bypass valves are closed and de-activated; or, 3) feedwater is isolated by a closed manual valve. In lower MODES, the MFW System is not in service and this Function is not required to be OPERABLE.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

6. Auxiliary Feedwater

The AFW System is designed to provide a secondary side heat sink for the reactor in the event that the MFW System is not available. The system has two motor driven pumps and a turbine driven pump, making it available during normal and accident operation. The normal source of water for the AFW System is the condensate storage system (not safety related). A low suction pressure to the AFW pumps will automatically realign the pump suctions to the Nuclear Service Water System (NSWS)(safety related). The AFW System is aligned so that upon a pump start, flow is initiated to the respective SGs immediately.

a. Auxiliary Feedwater-Automatic Actuation Logic and Actuation Relays

Automatic actuation logic and actuation relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

b. Auxiliary Feedwater-Steam Generator Water Level-Low Low

SG Water Level-Low Low provides protection against a loss of heat sink. A feed line break, inside or outside of containment, or a loss of MFW, would result in a loss of SG water level. SG Water Level-Low Low provides input to the SG Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system which may then require a protection function actuation and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with two-out-of-four logic. The setpoints are based on percent of narrow range instrument span.

SG Water Level—Low Low in any operating SG will cause the motor driven AFW pumps to start. The system is aligned so that upon a start of the pump, water immediately begins to flow to the SGs. SG Water Level—Low Low in any two operating SGs will cause the turbine driven pumps to start.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Auxiliary Feedwater—Safety Injection

An SI signal starts the motor driven AFW pumps. The AFW initiation functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

d. Auxiliary Feedwater-Loss of Offsite Power

A loss of offsite power to the service buses will be accompanied by a loss of reactor coolant pumping power and the subsequent need for some method of decay heat removal. The loss of offsite power is detected by a voltage drop on each essential service bus. Loss of power to either essential service bus will start the turbine driven and motor driven AFW pumps to ensure that at least two SGs contain enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip.

Functions 6.a through 6.d must be OPERABLE in MODES 1, 2, and 3 to ensure that the SGs remain the heat sink for the reactor. These Functions do not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW actuation does not need to be OPERABLE because either AFW or residual heat removal (RHR) will already be in operation to remove decay heat or sufficient time is available to manually place either system in operation.

e. Auxiliary Feedwater-Trip of All Main Feedwater Pumps

A Trip of all MFW pumps is an indication of a loss of MFW and the subsequent need for some method of decay heat and sensible heat removal to bring the reactor back to no load temperature and pressure. Each turbine driven MFW pump is equipped with three pressure switches on the trip oil system. A low pressure signal from two-out-of-three of these pressure switches indicates a trip of that pump. Three

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

OPERABLE channels per pump satisfy redundancy requirements with two-out-of-three logic. A trip of all MFW pumps starts the motor driven AFW pumps to ensure that at least two SGs are available with water to act as the heat sink for the reactor. This function must be OPERABLE in MODES 1 and 2. This ensures that at least two SGs are provided with water to serve as the heat sink to remove reactor decay heat and sensible heat in the event of an accident. In MODES 3, 4, and 5, the MFW pumps may be normally shut down, and thus neither pump trip is indicative of a condition requiring automatic AFW initiation.

f. Auxiliary Feedwater-Pump Suction Transfer on Suction Pressure-Low

A low pressure signal in the AFW pump suction line protects the AFW pumps against a loss of the normal supply of water for the pumps, the condensate storage system. Three pressure switches per train are located on the AFW pump suction line from the condensate storage system. A low pressure signal sensed by two-out-of-three switches will align their train related motor driven AFW pump and the turbine driven AFW pump to the assured water supply (NSWS). The NSWS (safety grade) is then lined up to supply the AFW pumps to ensure an adequate supply of water for the AFW System to maintain at least two of the SGs as the heat sink for reactor decay heat and sensible heat removal.

This Function must be OPERABLE in MODES 1, 2, and 3 to ensure a safety grade supply of water for the AFW System to maintain the SGs as the heat sink for the reactor. This Function does not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW automatic suction transfer does not need to be OPERABLE because RHR will already be in operation, or sufficient time is available to place RHR in operation, to remove decay heat.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

7. Automatic Switchover to Containment Sump

At the end of the injection phase of a LOCA, the RWST will be nearly empty. Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sump. The low head residual heat removal (RHR) pumps and containment spray pumps draw the water from the containment recirculation sump, the RHR pumps pump the water through the RHR heat exchanger, inject the water back into the RCS, and supply the cooled water to the other ECCS pumps. Switchover from the RWST to the containment sump must occur before the RWST empties to prevent damage to the RHR pumps and a loss of core cooling capability.

a. Automatic Switchover to Containment Sump-Automatic Actuation Logic and Actuation Relays

Automatic actuation logic and actuation relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

b. Automatic Switchover to Containment Sump-Refueling Water Storage Tank (RWST) Level-Low Coincident With Safety Injection

During the injection phase of a LOCA, the RWST is the source of water for all ECCS pumps. A low level in the RWST coincident with an SI signal provides protection against a loss of water for the ECCS pumps and indicates the end of the injection phase of the LOCA. The RWST is equipped with four level transmitters. These transmitters provide no control functions. Since an inadvertent switchover to the containment sump could have a significant safety impact, this instrumentation is placed in a bypass condition for testing. Therefore, four channels are supplied such that, during testing, the remaining three channels could perform

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

the intended function, and no single failure could result in either a failure to accomplish the intended function, or in an inadvertent switchover to the containment sump.

Automatic switchover occurs only if the RWST low level signal is coincident with SI. This prevents accidental switchover during normal operation. Accidental switchover could damage ECCS pumps if they are attempting to take suction from an empty sump. The automatic switchover Function requirements for the SI Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating Functions and requirements.

These Functions must be OPERABLE in MODES 1, 2, 3, and 4 when there is a potential for a LOCA to occur, to ensure a continued supply of water for the ECCS pumps. These Functions are not required to be OPERABLE in MODES 5 and 6 because there is adequate time for the operator to evaluate unit conditions and respond by manually starting systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident. System pressure and temperature are very low and many ESF components are administratively locked out or otherwise prevented from actuating to prevent inadvertent overpressurization of unit systems.

8. Engineered Safety Feature Actuation System Interlocks

To allow some flexibility in unit operations, several interlocks are included as part of the ESFAS. These interlocks permit the operator to block some signals, automatically enable other signals, prevent some actions from occurring, and cause other actions to occur. The interlock Functions back up manual actions to ensure bypassable functions are in operation under the conditions assumed in the safety analyses.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

a. Engineered Safety Feature Actuation System Interlocks—Reactor Trip, P-4

The P-4 interlock is enabled when a reactor trip breaker (RTB) and its associated bypass breaker is open. Operators are able to reset SI 60 seconds after initiation. If a P-4 is present when SI is reset, subsequent automatic SI initiations will be blocked until the RTBs have been manually closed. This Function allows operators to take manual control of SI systems after the initial phase of injection is complete while avoiding multiple SI initiations. The functions of the P-4 interlock are:

- Trip the main turbine;
- Isolate MFW with coincident low T_{avg};
- Prevent reactuation of SI after a manual reset of SI;
- Transfer the steam dump from the load rejection controller to the unit trip controller; and
- Prevent opening of the MFW isolation valves if they were closed on SI or SG Water Level—High High.

Each of the above Functions is interlocked with P-4 to avert or reduce the continued cooldown of the RCS following a reactor trip. An excessive cooldown of the RCS following a reactor trip could cause an insertion of positive reactivity with a subsequent increase in generated power. To avoid such a situation, the noted Functions have been interlocked with P-4 as part of the design of the unit control and protection system.

None of the noted Functions serves a mitigation function in the unit licensing basis safety analyses. Only the turbine trip Function is explicitly assumed since it is an immediate consequence of the reactor trip Function. Neither turbine trip, nor any of the other four Functions associated with the reactor trip signal, is required to show that the unit licensing basis safety analysis acceptance criteria are not exceeded.

The RTB position switches that provide input to the P-4 interlock only function to energize or de-energize or open or close contacts. Therefore, this Function has no adjustable

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

trip setpoint with which to associate a Trip Setpoint and Allowable Value.

This Function must be OPERABLE in MODES 1, 2, and 3 when the reactor may be critical or approaching criticality. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because the main turbine, the MFW System, and the Steam Dump System are not in operation.

b. Engineered Safety Feature Actuation System Interlocks-Pressurizer Pressure, P-11

The P-11 interlock permits a normal unit cooldown and depressurization without actuation of SI or main steam line isolation. With two-out-of-three pressurizer pressure channels (discussed previously) less than the P-11 setpoint, the operator can manually block the Pressurizer Pressure-Low SI signal and the Steam Line Pressure-Low steam line isolation signal (previously discussed). When the Steam Line Pressure-Low steam line isolation signal is manually blocked, a main steam isolation signal on Steam Line Pressure-Negative Rate-High is enabled. This provides protection for an SLB by closure of the MSIVs. With two-out-of-three pressurizer pressure channels above the P-11 setpoint, the Pressurizer Pressure-Low SI signal and the Steam Line Pressure-Low steam line isolation signal are automatically enabled. The operator can also enable these trips by use of the respective manual reset buttons. When the Steam Line Pressure-Low steam line isolation signal is enabled, the main steam isolation on Steam Line Pressure-Negative Rate—High is disabled.

This Function must be OPERABLE in MODES 1, 2, and 3 to allow an orderly cooldown and depressurization of the unit without the actuation of SI or main steam isolation. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because system pressure must already be below the P-11 setpoint for the requirements of the heatup and cooldown curves to be met.

c. Engineered Safety Feature Actuation System Interlocks-T_{avg}-Low Low, P-12

On increasing reactor coolant temperature, the P-12 interlock provides an arming signal to the Steam Dump System. On a

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

decreasing temperature, the P-12 interlock removes the arming signal to the Steam Dump System to prevent an excessive cooldown of the RCS due to a malfunctioning Steam Dump System.

Since T_{avg} is used as an indication of bulk RCS temperature, this Function meets redundancy requirements with one OPERABLE channel in each loop. These channels are used in two-out-of-four logic. This Function must be OPERABLE in MODES 1, 2, and 3 when a secondary side break or stuck open valve could result in the rapid depressurization of the steam lines. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because there is insufficient energy in the secondary side of the unit to have an accident.

9. Containment Pressure Control System Permissives

The Containment Pressure Control System (CPCS) protects the Containment Building from excessive depressurization by preventing inadvertent actuation or continuous operation of the Containment Spray and Containment Air Return Systems when containment pressure is at or less than the CPCS permissive setpoint. The control scheme of CPCS is comprised of eight independent control circuits (4 per train), each having a separate and independent pressure transmitter and current alarm module. Each pressure transmitter monitors the containment pressure and provides input to its respective current alarm. The current alarms are set to inhibit or terminate containment spray and containment air return systems when containment pressure falls to or below 0.25 psig. The alarm modules switch back to the permissive state (allowing the systems to operate) when containment pressure is greater than or equal to 0.45 psig.

This function must be OPERABLE in MODES 1, 2, 3, and 4 when there is sufficient energy in the primary and secondary sides to pressurize containment following a pipe break. In MODES 5 and 6, there is insufficient energy in the primary and secondary sides to significantly pressurize the containment.

10. Nuclear Service Water System Suction Transfer – Low Pit Level

Upon an emergency low pit level signal from either NSWS pit, interlocks isolate the NSWS from Lake Wylie, align NSWS to the standby nuclear service water pond, close particular crossover

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- Phase B Isolation; and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (12 hours total time) and in MODE 5 within an additional 30 hours (42 hours total time). The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. The Required Actions are not required to be met during this time, unless the train is discovered inoperable during the testing. This allowance is based on the reliability analysis assumption of WCAP-10271-P-A (Ref. 7) that 4 hours is the average time required to perform channel surveillance.

D.1, D.2.1, and D.2.2

Condition D applies to:

- Containment Pressure-High;
- Pressurizer Pressure-Low;
- Steam Line Pressure-Low;
- Steam Line Pressure-Negative Rate-High;
- SG Water level—Low Low; and
- SG Water level—High High (P-14) for the Feedwater Isolation Function.

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Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1 and G.2

Condition G applies to manual initiation of Steam Line Isolation.

This action addresses the operability of the manual steam line isolation function for each individual main steam isolation valve. If a channel is inoperable, 48 hours is allowed to return it to an OPERABLE status. If the train cannot be restored to OPERABLE status, the Conditions and Required Actions of LCO 3.7.2, "Main Steam Isolation Valves," must be entered for the associated inoperable valve. The specified Completion Time is reasonable considering that there is a system level manual initiation train for this Function and the low probability of an event occurring during this interval.

H.1, H.2.1 and H.2.2

Condition H applies to the automatic actuation logic and actuation relays for the Steam Line Isolation, Feedwater Isolation, and AFW actuation Functions.

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly

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manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

I.1 and I.2

Condition I applies to the automatic actuation logic and actuation relays for the Turbine Trip Function.

This action addresses the train orientation of the SSPS and the master and slave relays for this Function. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the following 6 hours. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. These Functions are no longer required in MODE 3. Placing the unit in MODE 3 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

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J.1 and J.2

Condition J applies to:

- SG Water Level—High High (P-14) for the Turbine Trip Function; and
- T_{avg}-Low.

If one channel is inoperable, 6 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-three logic will result in actuation. The 6 hour Completion Time is justified in Reference 7. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 7.

K.1 and K.2

Condition K applies to the AFW pump start on trip of all MFW pumps.

This action addresses the auto start function of the AFW System on loss of all MFW pumps. The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. If one or more channels are inoperable on one pump or one channel is inoperable on both pumps, 1 hour is allowed to return the channel(s) to an OPERABLE status or to place the channel(s) in trip. If the function cannot be returned to an OPERABLE status or placed in a trip condition, 6 hours are allowed to place the unit in MODE 3. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

ACTIONS (continued)

L.1

Not Used.

M.1, M.2.1 and M.2.2

Condition M applies to the Auxiliary Feedwater Pumps Suction Transfer on Suction Pressure Low.

If one channel is inoperable on one or both trains, 1 hour is allowed to restore the channel to OPERABLE status or to place it in the tripped condition. The failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 1 hour requires the unit to be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, this Function is no longer required OPERABLE.

N.1, N.2.1 and N.2.2

Condition N applies to:

- RWST Level—Low Low Coincident with Safety Injection.

RWST Level—Low Low Coincident With SI provides actuation of switchover to the containment sump. Note that this Function requires the bistables to energize to perform their required action. The failure of up to two channels will not prevent the operation of this Function. However, placing a failed channel in the tripped condition could result in a premature switchover to the sump, prior to the injection of the minimum volume from the RWST. Placing the inoperable channel in bypass results in a two-out-of-three logic configuration, which satisfies the requirement to allow another failure without disabling actuation of the switchover when required. Restoring the channel to OPERABLE status or placing the inoperable channel in the bypass condition within 6 hours is sufficient to ensure that the Function remains OPERABLE, and minimizes

ACTIONS (continued)

the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The 6 hour Completion Time is justified in Reference 7. If the channel cannot be returned to OPERABLE status or placed in the bypass condition within 6 hours, the unit must be brought to MODE 3 within the following 6 hours and MODE 5 within the next 30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows placing a second channel in the bypass condition for up to 2 hours for surveillance testing. The total of 12 hours to reach MODE 3 and 2 hours for a second channel to be bypassed is acceptable based on the results of Reference 7.

O.1, O.2.1 and O.2.2

Condition O applies to the P-11 and P-12 interlocks.

With one channel inoperable, the operator must verify that the interlock is in the required state for the existing unit condition. This action manually accomplishes the function of the interlock. Determination must be made within 1 hour. The 1 hour Completion Time is equal to the time allowed by LCO 3.0.3 to initiate shutdown actions in the event of a complete loss of ESFAS function. If the interlock is not in the required state (or placed in the required state) for the existing unit condition, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of these interlocks.

P.1

Condition P applies to the Containment Pressure Control System Start and Terminate Permissives.

With one or more channels inoperable, the affected containment spray and containment air return systems components must be declared

ACTIONS (continued)

inoperable immediately. The supported system LCOs provide the appropriate Required Actions and Completion Times for the equipment made inoperable by the inoperable channel. The immediate Completion Time is appropriate since the inoperable channel could prevent the supported equipment from starting when required. Additionally, protection from an inadvertent actuation may not be provided if the terminate function is not OPERABLE.

Q.1, Q.2, Q.3.1, and Q.3.2

With one channel of NSWS Suction Transfer - Low Pit Level inoperable in one or more NSWS pits, 4 hours are allowed to place it in the tripped condition or align the NSWS to the Standby NSWS Pond. The failure of one channel places the Function in a two-out-of-two configuration. The failed channel must either be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements, or the NSWS realigned to fulfill the safety function.

Failure to place the channel in the tripped condition or to realign the NSWS suction and discharge within 4 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 5 within the next 30 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, this Function is no longer required OPERABLE.

R.1, R.2.1, and R.2.2

With two or more channels of NSWS Suction Transfer - Low Pit Level inoperable in one or more pits, the NSWS must be aligned to the Standby NSWS Pond within 4 hours. Failure to accomplish the realignment within 4 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 5 within the next 30 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, this Function is no longer required OPERABLE.

ACTIONS (continued)

S.1 and S.2

Condition S applies to:

- Reactor Trip (P-4) for the Turbine Trip Function.

If one train is inoperable, 48 hours are allowed to restore it to OPERABLE status. The specified Completion Time is reasonable considering the nature of this Function and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 3 and lower MODES, the turbine generator is not in service and this Function is not required to be OPERABLE.

T.1

Condition T applies to the AFW loss of offsite power Function.

If one or more channels per bus are inoperable, Required Action T.1 requires immediately entering the applicable Conditions and Required Actions of LCO 3.3.5, "Loss of Power Diesel Generator Start Instrumentation," for the inoperable channel(s). It is appropriate to enter LCO 3.3.5, since the applicable relays for Function 6.d are physically the same relays that start the diesel generators.

Required Action T.1 is modified by a Note that allows one inoperable channel per bus to be bypassed for up to 4 hours for surveillance testing of other channels. The 4 hours allowed for testing is justified based upon industry experience.

U.1

Condition U applies when two or more channels on one train are inoperable.

Required Action U.1 requires immediately declaring the associated AFW train inoperable. This is necessary since with two or more instrumentation channels inoperable, the instrumentation train is no longer able to perform its required actuation function. With the associated AFW train declared inoperable, LCO 3.7.5, "Auxiliary Feedwater System," provides the appropriate remedial actions.

SURVEILLANCE REQUIREMENTS

The SRs for each ESFAS Function are identified by the SRs column of Table 3.3.2-1.

A Note has been added to the SR Table to clarify that Table 3.3.2-1 determines which SRs apply to which ESFAS Functions.

Note that each channel of process protection supplies both trains of the ESFAS. When testing channel I, train A and train B must be examined. Similarly, train A and train B must be examined when testing channel II, channel III, and channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

SR 3.3.2.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and reliability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.2.2

SR 3.3.2.2 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 31 days on a STAGGERED TEST BASIS, using the semiautomatic tester. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the

SURVEILLANCE REQUIREMENTS (continued)

semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and that there is an intact voltage signal path to the master relay coils. The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.3

SR 3.3.2.3 is the performance of a TADOT every 31 days. This test is a check of the Loss of Offsite Power Function. Each Function is tested up to, and including, the master transfer relay coils.

This test also includes trip devices that provide actuation signals directly to the SSPS. The SR is modified by a Note that excludes final actuation of pumps and valves to minimize plant upsets that would occur. The Frequency is adequate based on operating experience, considering instrument reliability and operating history data.

SR 3.3.2.4

SR 3.3.2.4 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The time allowed for the testing (4 hours) and the surveillance interval are justified in Reference 7.

SR 3.3.2.5

SR 3.3.2.5 is the performance of a COT.

A COT is performed on each required channel to ensure the channel will perform the intended Function. The tested portion of the loop must trip within the Allowable Values specified in Table 3.3.1-1.

SURVEILLANCE REQUIREMENTS (continued)

The setpoint shall be left set consistent with the assumptions of the setpoint methodology.

The Frequency of 92 days is justified in Reference 7.

SR 3.3.2.6

SR 3.3.2.6 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation MODE is either allowed to function, or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation MODE is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing the slave relay. This test is performed every 92 days. The Frequency is adequate, based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.7

SR 3.3.2.7 is the performance of a COT on the RWST level and Containment Pressure Control Start and Terminate Permissives.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.1-1. This test is performed every 31 days. The Frequency is adequate, based on operating experience, considering instrument reliability and operating history data.

SR 3.3.2.8

SR 3.3.2.8 is the performance of a TADOT. This test is a check of the Manual Actuation Functions, AFW pump start on trip of all MFW pumps, AFW low suction pressure, Reactor Trip (P-4) Interlock, and Doghouse Water Level - High High Feedwater Isolation. It is performed every 18 months. Each Manual Actuation Function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.). The Frequency is adequate, based on industry operating experience and is

SURVEILLANCE REQUIREMENTS (continued)

consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT for manual initiation Functions. The manual initiation Functions have no associated setpoints.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a CHANNEL CALIBRATION.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology.

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable. The applicable time constants are shown in Table 3.3.2-1.

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing acceptance criteria are included in the UFSAR (Ref. 2). Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the Trip Setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer functions set to one with the resulting measured response time compared to the appropriate UFSAR response time. Alternately, the response time

SURVEILLANCE REQUIREMENTS (continued)

test can be performed with the time constants set to their nominal value provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 600 psig in the SGs.

SR 3.3.2.11

SR 3.3.2.11 is the performance of a COT on the NSWS Suction Transfer - Low Pit Level.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1. This test is performed every 18 months. The Frequency is adequate based on operating experience.

SR 3.3.2.12

SR 3.3.2.12 is the performance of an ACTUATION LOGIC TEST on the NSWS Suction Transfer-Emergency Low Pit Level.

An ACTUATION LOGIC TEST to satisfy the requirements of GL 96-01 is performed on each NSWS Pit Suction Transfer instrumentation to ensure all combinations will initiate a transfer to the SNSWP. This test is performed every 18 months. The Frequency is adequate based on operating experience.

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 7.

3. UFSAR, Chapter 15.

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

7. WCAP-10271-P-A, Supplement 1 and Supplement 2, Rev. 1, May 1986 and June 1990.

3.3 INSTRUMENTATION

3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

LCO 3.3.5 Three channels per bus of the loss of voltage Function and three channels per bus of the degraded voltage Function shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources — Shutdown."

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel per bus inoperable.	----------NOTE---------- One inoperable channel per bus may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- A.1 Place channel in trip.	6 hours
B. One or more Functions with two or more channels per bus inoperable.	B.1 Restore all but one channel to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.	Immediately

BASES

APPLICABILITY

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on an LOP or degraded power to the vital bus.

ACTIONS

A channel shall be OPERABLE if the point at which the channel trips is found more conservative than the Allowable Value. In the event a channel's trip setpoint is found less conservative than the Allowable Value, or the transmitter, instrument loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. If plant conditions warrant, the trip setpoint may be set outside the NOMINAL TRIP SETPOINT calibration tolerance band as long as the trip setpoint is conservative with respect to the NOMINAL TRIP SETPOINT. If the trip setpoint is found outside of the NOMINAL TRIP SETPOINT calibration tolerance band and non-conservative with respect to the NOMINAL TRIP SETPOINT, the setpoint shall be re-adjusted.

Because the required channels are specified on a per bus basis, the Condition may be entered separately for each bus as appropriate.

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in the LCO. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to the LOP DG start Function with one loss of voltage or degraded voltage channel per bus inoperable.

If one channel is inoperable, Required Action A.1 requires that channel to be placed in trip within 6 hours. With a channel in trip, the LOP DG start instrumentation channels are configured to provide a one-out-of-two logic to initiate a trip of the incoming offsite power. The required action is modified by a note that allows one inoperable channel per bus to be bypassed for up to 4 hours for surveillance testing of other channels.

The specified Completion Time is reasonable considering the Function remains fully OPERABLE on every bus and the low probability of an event occurring during these intervals.

Attachment 3

Description of Proposed Changes and Technical Justification for Catawba Nuclear Station

The changes proposed in this license amendment request (LAR) apply to Technical Specification (TS) 3.3.2, Engineered Safety Feature Actuation System (ESFAS); TS Table 3.3.2-1, Engineered Safety Feature Actuation System (ESFAS) Instrumentation; and TS 3.3.5, Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation, for Catawba Nuclear Station. The proposed changes are discussed below.

Catawba Nuclear Station - Proposed Changes to TS 3.3.2, Engineered Safety Feature Actuation System and TS Table 3.3.2-1, Engineered Safety Feature Actuation System Instrumentation

The purpose of the ESFAS is to initiate necessary safety systems based on the values of selected unit parameters, to protect against violating core design limits and the reactor coolant system pressure boundary, as well as to mitigate accidents. The proposed changes for the Catawba ESFAS TS are discussed in the following 22 items listed below. A description of the proposed change and a technical justification are provided for each of the items.

NOTE: As proposed below in Item 8, ESFAS Function 5 as it is now listed in Table 3.3.2-1, is being divided and displayed in a new alpha/numerical order. Unless stated otherwise, when affected contents of Table 3.3.2-1, current-Function 5, are referenced within Attachment 3, the proposed new alpha/numerical designation is used.

1. In Condition K and Required Action K.1 of Catawba TS 3.3.2, "channel" is being changed to "channels." Also, the phrase, "on one pump or one channel inoperable on both pumps" is being added to condition K. This change is applicable to ESFAS Function 6.e, Auxiliary Feedwater, Trip of all Main Feedwater Pumps, as shown on TS Table 3.3.2-1 and is discussed in detail in Item 19 below.

2. Condition L is being changed to state "Not used." The current Function 5.e, Doghouse Water Level-High High, is the only use of Condition L in Table 3.3.2-1 and it is being proposed to delete this function as discussed in Item 14 below. The Bases discussion for this condition is also being revised to state "Not used."

Attachment 3

Description of Proposed Changes and Technical Justification for Catawba Nuclear Station

3. In Condition M of Catawba TS 3.3.2, the phrase, "on one or both trains" is being added. This change is applicable to ESFAS Function 6.f, Auxiliary Feedwater, Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure- Low, as shown on TS Table 3.3.2-1 and is discussed in detail in Item 20 below.

4. A new Condition S is being added to TS 3.3.2. Proposed Condition S specifies Required Actions and Completion Times for one channel or train inoperability and is being made applicable to Function 5.a.(4), Reactor Trip (P-4). The specified required action and completion time for the new Condition S are modeled after, and consistent with, TS 3.3.2 Condition F, except the end state is MODE 3 instead of MODE 4, since Catawba Function 5.a.(4) is required to be operable in MODES 1 and 2. Also see Item 15 for related discussion of this proposed change.

5. A new Condition T is being added to TS 3.3.2. Proposed Condition T specifies Required Actions and Completion Times for one or more channels per bus inoperable and is being made applicable to Function 6.d, Auxiliary Feedwater, Loss of Offsite Power, as shown in TS Table 3.3.2-1. This proposed change is discussed in detail in Item 18 below.

6. A new Condition U is being added to TS 3.3.2. Proposed Condition U specifies Required Actions and Completion Times for two or more channels inoperable on one train and is being made applicable to Function 6.f, Auxiliary Feedwater, Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure- Low, as shown on TS Table 3.3.2-1. This proposed change is discussed in detail in Item 20 below.

7. A new Surveillance Requirement (SR) is being added to TS 3.3.2. Proposed SR 3.3.2.12 specifies the performance of an Actuation Logic Test at a Frequency of 18 months. This new SR applies to Function 10, Nuclear Service Water Suction Transfer- Low Pit Level as listed in Table 3.3.2-1. During Catawba's Generic Letter 96-01 review and subsequent NRC inspection, it was discovered that the Standby Nuclear Service Water Pond (SNSWP) swap logic is not tested according to Generic Letter 96-01 requirements. The SNSWP swap logic aligns the Nuclear Service Water System (RN) to the SNSWP if two out of three pit level transmitters detect

low pit level. NRC Generic Letter 96-01 requires that this combinational logic be tested to ensure that all combinations of the 2-out-of-3 logic (i.e., transmitter 1&2, 1&3, and 2&3) will initiate the SNSWP swap sequence. Based on the results of NRC inspections for GL 96-01, it was determined that this logic testing should be added to TS 3.3.2. This proposed change is a conservative addition that corrects an apparent omission in the current Catawba TS, since there is now no requirement to perform an actuation logic test on this RN instrumentation. The specified frequency for new SR 3.3.2.12 is consistent with that for current TS 3.3.2 SRs 3.3.2.8, 3.3.2.9, 3.3.2.10, and 3.3.2.11.

8. In Table 3.3.2-1, Function 5, Turbine Trip and Feedwater Isolation is being divided into two listings in the table. The proposed listings will be 5.a, Turbine Trip and 5.b, Feedwater Isolation. Function 5 now contains six items (current Items 5.a through 5.f). Function 5 is being divided because some of these items apply only to the Turbine Trip Function, some of the items apply only to the Feedwater Isolation Function, while some of the items apply to both the Turbine Trip and the Feedwater Isolation Functions. The Catawba TS have more items listed under Function 5 than does NUREG 1431, *Standard Technical Specifications for Westinghouse Plants*. For Catawba, these additional items are T_{avg}-Low and coincident with Reactor Trip, P-4; Doghouse Water Level-High High (which is being proposed for deletion from the TS in Item 14); and Trip of all Main Feedwater Pumps (which is being proposed for deletion from the TS in Item 17). In actuality, prior to the conversion to the Improved Technical Specifications (ITS), the former Catawba TS had separate listings in Table 3.3-3 for turbine trip and feedwater isolation. This proposed change reverts back to the pre-ITS format and clarifies the current TS requirements that apply to these two functions (the Turbine Trip and Feedwater Isolation Functions). This change makes it easier to clearly implement this TS during plant operations and testing. For Catawba, currently in Table 3.3.2-1, Function 5, Turbine

Attachment 3

Description of Proposed Changes and Technical Justification for Catawba Nuclear Station

Trip and Feedwater Isolation lists six items as:

a. Automatic Actuation Logic and Actuation Relays
b. SG Water Level- High High (P-14)
c. Safety Injection
d. T_{avg}-Low and coincident with Reactor Trip, P-4
e. Doghouse Water Level-High High
f. Trip of all main feedwater pumps

As proposed in this LAR, current Function 5, Turbine Trip and Feedwater Isolation, would be displayed for Catawba as:

5.a. Turbine Trip
(1) Automatic Actuation Logic and Actuation Relays
(2) SG Water Level- High High (P-14)
(3) Safety Injection
(4) Reactor Trip (P-4) - which is a proposed new item.

5.b. Feedwater Isolation
(1) Automatic Actuation Logic and Actuation Relays
(2) SG Water Level- High High (P-14)
(3) Safety Injection
(4) T_{avg}-Low and coincident with Reactor Trip, P-4

Note current Functions 5.e, Doghouse Water Level-High High and 5.f, Trip of all main feedwater pumps, are being deleted altogether, as discussed in Items 14 and 17 below. The applicable Bases are also revised to be consistent with the proposed new listing order of Table 3.3.2-1. Additional changes are also being proposed within Table 3.3.2-1, current-Function 5, and these are discussed subsequently in Attachment 3. The discussions for these additional changes to current-Function 5 are contained in Items 9 through 17 that follow. Note, except for Items 14 and 17 (the proposed deletion of current Functions 5.e and 5.f) these discussions use the proposed new listing order as it applies to the applicable item.

9. In Table 3.3.2-1, for Function 5.a.(1), Turbine Trip, Automatic Actuation Logic and Actuation Relays: new Footnote (f) is being applied to the MODE 1 and MODE 2 applicability requirements. New Footnote (f) is discussed below in Item 16.

10. In Table 3.3.2-1, for Function 5.a.(2), Turbine Trip, SG Water Level-High High (P-14): new Footnote (f) is being applied to the MODE 1 and MODE 2 applicability requirements. New Footnote (f) is discussed below in Item 16.

11. In Table 3.3.2-1, for Function 5.b.(1), Feedwater Isolation, Automatic Actuation Logic and Actuation Relays: A new MODE 3 operability requirement with Footnote (e) is being added. The justification for the new MODE 3 operability requirement is provided following Item 12. The applicable Condition is being changed from I to H since the Required Action for an inoperable train specified in Condition H has an end state of MODE 4. Since a MODE 3 operability requirement is being added to this function, it follows that the correct end state is MODE 4. Also, an editorial change is being made to Footnote (e) to make it clear there are three implementation alternatives that can be used.

12. In Table 3.3.2-1, for Function 5.b.(2), Feedwater Isolation, SG Water Level-High High (P-14): A new MODE 3 operability requirement with Footnote (e) is being added. The justification for the new MODE 3 operability requirement is provided in the following paragraphs. The applicable Condition is being changed from J to D since the Required Action for an inoperable channel specified in Condition D has an end state of MODE 4. Since a MODE 3 operability requirement is being added to this function, it follows that the correct end state is MODE 4.

    The P-14 interlock provides feedwater isolation when the hi-hi Steam Generator (SG) level setpoint is reached. The former Catawba TS had separate listings in Table 3.3-3 for turbine trip, feedwater isolation, and the P-14 interlock. Turbine trip and feedwater isolation on hi-hi SG level were required operable in MODES 1 and 2. The P-14 interlock, however, was required operable in MODES 1, 2, and 3. During the conversion to the Catawba ITS, the requirement to have P-14 operable in MODE 3 was inadvertently deleted. The purpose of this proposed change is to reinstate the

requirement for P-14 to be operable in MODE 3 at Catawba. The ITS reference document, NUREG 1431, *Standard Technical Specifications for Westinghouse Plants*, has a bracketed MODE 3 requirement in regard to P-14. The bracket indicates that the requirement was to be included in the ITS conversion process depending on whether the former Technical Specifications contained the requirement. During the ITS conversion, the P-14 entry for the ESFAS Interlock Function was deleted under an administrative change, with the justification being that it was captured under the Turbine Trip and Feedwater Isolation Functions. Consequently, the MODE 3 requirement was inadvertently dropped and this was not specifically called out in the Duke ITS submittal. A PIP was initiated to evaluate this situation at Catawba. PIP, the Problem Investigation Process, is Duke's formal corrective action process for evaluating identified problems that may have operability concerns. No operability concerns were identified since Catawba Operations currently maintains P-14 operable in MODE 3 by procedure. Duke has determined that there should be a MODE 3 operability requirement in the TS for the P-14 function, since the feedwater system could now be placed in service with full automatic control in MODE 3. This could lead to a potential for a SG overfill to occur in MODE 3. Following implementation of this proposed change, MODE 4 will be the correct end state for this situation. Since the Automatic Actuation Logic and Actuation Relays are required for P-14 to be operable, the same change is also being made to Function 5.b.(1). Therefore, this proposed change applies to Functions 5.b.(1) and 5.b.(2).

13. In Table 3.3.2-1, for Function 5.a.(3), Turbine Trip, Safety Injection, the statement, "See Item 5.a.(1) for Applicable Modes," is being added. In Table 3.3.2-1, for Function 5.b.(3), Feedwater Isolation, Safety Injection, the statement, "See Item 5.b.(1) for Applicable Modes," is being added. Currently these functions reference only Function 1 (Safety Injection) for all initiation functions and requirements. This proposed addition clarifies the applicable MODES for items 5.a.(3) and 5.b.(3), Safety Injection, as applicable to both the Turbine Trip and Feedwater Isolation Functions.

14. In Table 3.3.2-1 current Function 5.e, Turbine Trip and Feedwater Isolation, Doghouse Water Level-High High, is being deleted. Duke is proposing the deletion of current ESFAS Function 5.e from Table 3.3.2-1 in order to support implementation of plant modifications that are presently under development at Catawba. These modifications will upgrade the doghouse level instrumentation by adding two new level switches per train per doghouse in order to provide a 2 out of 3 trip circuit to be utilized such that inadvertent trip actuations can be avoided. The High-High Doghouse Water Level Feedwater Isolation Function is not credited in any of Catawba's accident analyses. Additionally, this function is not modeled in the Catawba PRA (it is therefore not a risk-significant plant feature) and neither is it contained in NUREG 1431, *Standard Technical Specifications for Westinghouse Plants*. Based on these considerations, this function has been determined to not meet the 10CFR50.36 criteria for inclusion in plant TS since it: 1) is not used to detect reactor coolant boundary leakage, 2) is not credited in any accident analyses, 3) doesn't function to mitigate an accident, and 4) is not risk significant. Therefore, this function is being proposed for deletion from the Catawba TS entirely and relocated to Duke's Selected Licensee Commitments Program such that appropriate administrative controls will be maintained for it in the future. This deletion is deemed preferable to modifying the current TS to specify a new setpoint and logic configuration for this function, and later having to implement the changes for each unit separately during the future outages when the installations of the modifications are planned. Appropriate changes are made to the TS Bases to reflect the deletion of this function, consistent with the changes to the TS themselves.

15. In Table 3.3.2-1, a new Catawba Function 5.a.(4), Turbine Trip, Reactor Trip (P-4) is being added. Appropriate requirements for Mode Applicability, Required Channels, Conditions (see Item 4), and Surveillance Requirements are also included. This new function is being created and added to Table 3.3.2-1 as a clarification, since a Reactor Trip (P-4) causes a Turbine Trip. New Footnote (f) is being applied to the MODE 1 and MODE 2 applicability requirements. Footnote (f) is discussed in Item 16 below. A new separate Bases Section for the new function is being added.

16. A new Footnote (f) is being added to Table 3.3.2-1. This new footnote reads: "Except when steam admission to the Main Turbine is prevented." This footnote is being added to clarify that the applicable functions are no longer required to be operable when action is taken in order to isolate the main turbine from possible water induction. The Bases are also revised to discuss the implementation of this footnote.

17. In Table 3.3.2-1 current Function 5.f, Turbine Trip and Feedwater Isolation, Trip of all main feedwater pumps, is being deleted. This function initiates a trip of the main turbine when both main feedwater pumps are tripped. This function is provided to limit the loss of steam generator water level upon a loss of normal feedwater. Three oil pressure switches are provided on each main feedwater pump trip oil system. A low pressure in two out of three switches on both main feedwater pumps will initiate a turbine trip. Current Function 5.f requires three channels of operable instrumentation per main feedwater pump for this function. Current Function 5.f refers to Condition K. Condition K states that with one main feedwater pump trip channel inoperable, either the affected channel must be placed in trip within 1 hour or the unit must be in Mode 3 within 7 hours. Since there are no other conditions referenced for this function, in the event that more than one channel of this instrumentation becomes inoperable, TS 3.0.3 would apply.

    Duke is proposing to delete this function from TS Table 3.3.2-1 since . The function of tripping the main turbine upon loss of both main feedwater pumps is anticipatory in nature only, and is not credited in any accident analysis. The loss of normal feedwater flow transient is discussed in Section 15.2.7 of the Catawba UFSAR. The accident analysis for this transient shows that the loss of feedwater, whether it is caused by main feedwater pump failures or other initiating events, is mitigated by the steam generator low-low level reactor trip function. If a loss of both main feedwater pumps were to occur, the accident analysis shows that the reactor trip occurs on low-low steam generator level, which in turn, causes a turbine trip to occur via the P-4 ESFAS Interlock (TS Table 3.3.2-1, Function 8a). In addition, the deletion of current Function 5.f from TS Table 3.3.2-1 is consistent with Revision 1 of NUREG-1431, *Standard Technical Specifications, Westinghouse Plants,*

which does not contain this ESFAS function. Based on these considerations, this function has been determined to not meet the 10CFR50.36 criteria for inclusion in plant TS since it: 1) is not used to detect reactor coolant boundary leakage, 2) is not credited in any accident analyses, 3) doesn't function to mitigate an accident, and 4) is not risk significant. This function will be relocated to Duke's Selected Licensee Commitments Program such that appropriate administrative controls will be maintained for it in the future. Appropriate changes are made to the TS Bases to reflect the deletion of this function, consistent with the changes to the TS themselves.

18. In TS Table 3.3.2-1, Function 6.d is the Auxiliary Feedwater, Loss of Offsite Power Function. This function detects a voltage drop on the essential service busses and starts the turbine driven and motor driven auxiliary feedwater pumps. This ensures that at least one steam generator contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip. Function 6.d requires three operable instrumentation channels per bus. Function 6.d refers to Condition D. Condition D states that with one channel inoperable, the inoperable channel must be placed in the tripped condition within 6 hours or the unit must be in Mode 3 within 12 hours and in Mode 4 within 18 hours. There is no condition when more than one channel of this instrumentation becomes inoperable; therefore, TS 3.0.3 applies in this case.

    At Catawba, the relays used to sense an undervoltage condition for starting the auxiliary feedwater pumps are physically the same relays used to start the diesel generators. TS 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation," governs the instrumentation used during a loss of power diesel generator start. Appropriately, Catawba is proposing to make the conditions and required actions associated with ESFAS Function 6.d correspond with the conditions and required actions associated with TS 3.3.5. The TS Table 3.3.2-1 reference to Condition D is being replaced with a reference to new Condition T, which is modeled using the same logic as that found in the conditions for TS 3.3.5. Condition T applies to the plant condition where one or more channels per bus are inoperable. Required Action T.1 requires entering LCO

3.3.5, immediately. Also, the concept of the note in Condition D with respect to bypassing an inoperable channel for up to 4 hours for surveillance testing of other channels is being incorporated into new Condition T and into Condition A of TS 3.3.5, as well. This new condition and required action references TS 3.3.5, since the same relays are used to detect an undervoltage condition, whether they are referenced in TS 3.3.2 or TS 3.3.5. It is not necessary to require a TS 3.0.3 entry and associated plant shutdown within the time limits of TS 3.0.3 for more than one inoperable channel, when a TS 3.0.3 entry is not required for the case of an inoperable auxiliary feedwater train. Appropriate changes are made to the TS Bases to reflect the addition of these new conditions, consistent with the changes to the TS themselves.

19. In TS Table 3.3.2-1, Function 6.e is the Auxiliary Feedwater, Trip of all Main Feedwater Pumps Function. This function starts the motor driven auxiliary feedwater pumps to ensure that at least one steam generator is available with water to act as the heat sink for the reactor. Each main feedwater pump is equipped with three pressure switches on the trip oil system. A low pressure signal from two out of three of these pressure switches indicates a trip of that pump. Function 6.e requires three operable instrumentation channels per pump. Function 6.e refers to Condition K. Condition K states that with one main feedwater pumps trip channel inoperable, the inoperable channel must be placed in the tripped condition within 1 hour or the unit must be in Mode 3 within 7 hours. There are no conditions that apply for more than one inoperable channel of this instrumentation; therefore, TS 3.0.3 would apply in this case.

    Catawba is proposing to modify Condition K so that it applies to the case of one or more inoperable main feedwater pumps trip channels on one pump or one inoperable channel on both pumps. If one channel becomes inoperable, the instrumentation logic degrades from a two-out-of-three condition to a two-out-of-two condition. It is appropriate to take the required action of placing one channel on the affected pump or pumps in the tripped condition within one hour. After placing the inoperable channel(s) in the tripped condition, the logic then becomes one-out-of-two. If two or more channels become inoperable on a single pump,

then placing the inoperable channels in the tripped condition satisfies the two-out-of-three logic and the corresponding safety function for that pump. A trip of the remaining pump would then result in an automatic start of the motor driven auxiliary feedwater pumps. If the affected channel(s) are not placed in the tripped condition within the required one hour time limit, then the unit must be placed in Mode 3 according to Required Action K.2. With one or more inoperable channels on a single pump or with one inoperable channel on both pumps, a spurious actuation of any single remaining channel on either pump would not result in an inadvertent start of the auxiliary feedwater system. In the event that two or more channels are inoperable on one pump concurrent with one or more inoperable channels on the other pump, TS 3.0.3 would still apply. Appropriate changes are made to the TS Bases, consistent with the changes made to the TS themselves. Also in TS Table 3.3.2-1 for Function 6.e, Footnote (a), as it applies to the MODE 2 applicability requirement, is being deleted. Footnote (a) states, "Above the P-11 (Presurizer Pressure) Interlock." This change is being made to correct an error since the plants cannot be operated below P-11 in MODE 2; consequently, the footnote has no meaning for the Trip of all Main Feedwater Pumps Function. Administrative adjustments to the listing of the applicable footnotes on each affected page are also being made as necessary.

20. In TS Table 3.3.2-1, Function 6.f is the Auxiliary Feedwater, Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure - Low Function. This function protects the auxiliary feedwater pumps against a loss of the normal supply of water for the pumps, the condensate storage system. Three pressure switches per train are located on the auxiliary feedwater pump suction line from the condensate storage system. A low pressure signal sensed by two out of three switches will align the train related motor driven auxiliary feedwater pump and the turbine driven auxiliary feedwater pump to the assured water supply, which is the nuclear service water system. The safety grade nuclear service water system is then lined up to supply the auxiliary feedwater pumps to ensure an adequate supply of water for the auxiliary feedwater system to maintain at least one of the steam generators as the heat sink for reactor decay heat and sensible heat removal. Function 6.f requires three operable instrumentation

channels per train. Function 6.f refers to Condition M. Condition M states that with one channel inoperable, the inoperable channel must be placed in the tripped condition within 1 hour or the unit must be in Mode 3 within 7 hours and in Mode 4 within 13 hours. There are no conditions that apply for more than one inoperable channel of this instrumentation; therefore, TS 3.0.3 would apply in this case.

Catawba is proposing to modify Condition M so that it applies to the case of one inoperable channel on one or both trains. If one channel becomes inoperable, the instrumentation logic degrades from a two-out-of-three condition to a two-out-of-two condition. It is appropriate to take the required action of placing one channel on the affected train or trains in the tripped condition within one hour. After placing the inoperable channel(s) in the tripped condition, the logic then becomes one-out-of-two. If the affected channel(s) are not placed in the tripped condition within the required one hour time limit, then the unit must be placed in Modes 3 and 4 according to Required Actions M.2.1 and M.2.2. Catawba is also proposing the creation of new Condition U, to apply when two or more channels become inoperable on a single train. In this case, the appropriate action is to immediately declare the associated auxiliary feedwater system train inoperable when it is made inoperable by the associated instrumentation channels. This is acceptable, since TS 3.7.5, "Auxiliary Feedwater (AFW) System" already provides for a 72-hour allowed outage time for one inoperable auxiliary feedwater system train. In the event that multiple channels (i.e., two or more) of this instrumentation become inoperable on both trains, then TS 3.0.3 would still apply. Appropriate changes are made to the TS Bases, consistent with the changes made to the TS themselves.

Note that in a safety evaluation dated April 6, 2001, the NRC issued Catawba Unit 1 Amendment 190 (TAC No. MB1208). This amendment approved a one-time change, applicable only to Unit 1, which added a footnote to Function 6f. This footnote is now being deleted since its provisions are being made permanent within the changes proposed in this LAR.

21. In Table 3.3.2-1, for Function 8.c, EFAS Interlocks, T_{avg}-Low Low, P-12: In the Required Channels Column, "1 per loop" is being changed to "4." This is an editorial change being made for consistency with other T_{avg} functions (e.g., the OTDT/OPDT Reactor Trips).

22. In Table 3.3.2-1, for Function 10, Nuclear Service Water Suction Transfer - Low Pit Level, new SR 3.3.2.12 is being added. The addition of this surveillance requirement is previously discussed in Item 7.

Changes to the Bases for TS 3.3.2 are also necessary to: 1) ensure consistency with the proposed TS changes described above; 2) change the minimum number of steam generators supplied by the Auxiliary Feedwater System for ESFAS Functions 6.d, 6.e, and 6.f, 3) revise the discussion of the instrumentation associated with the automatic switchover to the containment sump-refueling water storage tank level- low coincident with safety injection (Table 3.3.2-1, Function 7, Item b); and 4) make other administrative and editorial clarifications as necessary. Note that Items 2 and 3 are previously identified Catawba Bases changes being processed at this time that are unrelated to the other changes contained in this LAR. Note also that an unrelated typographical error is being corrected on Bases Page B3.3.2-47. An incorrect reference to Table 3.3.1-1 is being changed to the correct Table 3.3.2-1. These revisions to the Bases have been made and are also included in this LAR submittal package as shown in Attachments 1 and 2.

Catawba Nuclear Station Proposed Change to TS 3.3.5, Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

A note permitting the bypassing of one inoperable channel per bus for up to 4 hours for surveillance testing of other channels is being incorporated into Condition A of TS 3.3.5. This is consistent with the change proposing a new Condition T in TS 3.3.2 as described and discussed in detail above in Item 18 under the changes being proposed for TS 3.3.2. Just as for the new TS 3.3.2, Condition T, this proposed note is modeled using the same logic as that found in the current Condition D for TS 3.3.2.

Attachment 3

Description of Proposed Changes and Technical Justification for Catawba Nuclear Station

Conclusion

This LAR proposes a change to address a non-conservative situation that exists with Catawba TS 3.3.2 for the mode operability requirements of the P-14 function. The changes proposed in this LAR add a MODE 3 requirement for P-14 and the Automatic Actuation Logic and Actuation Relays under the Feedwater Isolation Function. This LAR makes other additions to TS Table 3.3.2-1 for Reactor Trip (P-4) under the Turbine Trip Function, and it also adds a new surveillance requirement for ESFAS instrumentation associated with the Nuclear Service Water System. Additional changes are proposed that clarify several existing requirements of the ESFAS instrumentation contained in TS Table 3.3.2, including the reformatting of a portion of this table to make it more useable. These additional changes are also conservative in nature and consistent with current plant operating practices and the applicable licensing bases.

Revisions are being made to the conditions applicable to several ESFAS functions associated with the Auxiliary Feedwater System and the relationship of one of these functions with the TS 3.3.5 requirements for the LOP DG Start Instrumentation. Further, changes are also proposed that delete two ESFAS functions. These changes have been found to be consistent with other applicable TS and the applicable safety analyses.

Therefore, based on the preceding considerations and the discussions detailed earlier in Attachment 3, it has been concluded that the changes proposed in this LAR are acceptable for implementation at Catawba. Since some of the changes proposed in this LAR address a current non-conservative situation in the Catawba TS, Duke is requesting timely NRC review and approval of this submittal.

Attachment 4

No Significant Hazards Consideration Determination

The following discussion is a summary of the evaluation of the changes contained in this proposed amendment against the 10 CFR 50.92(c) requirements to demonstrate that all three standards are satisfied. A no significant hazards consideration is indicated if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated, or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated, or

3. Involve a significant reduction in a margin of safety.

First Standard

Implementation of this amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated. Approval of this amendment will have no effect on accident probabilities or consequences. For the proposed changes to Technical Specifications (TS) 3.3.2, Engineered Safety Features Actuation System (ESFAS); and 3.3.5, Loss of Power Diesel Generator Start Instrumentation; the equipment referenced in these TS is not accident initiating equipment. Therefore, there will be no impact on any accident probabilities caused by the NRC approval of this amendment. Additionally, since the design of the equipment is not being adversely modified by these proposed changes, there will be no impact on any accident consequences.

Attachment 4

No Significant Hazards Consideration Determination

Second Standard

Implementation of this amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. No new accident causal mechanisms are created as a result of the NRC approval of this license amendment request. No changes are being made to the plant which will introduce any new accident causal mechanisms. This amendment request does not impact any plant systems that are accident initiators; therefore, no new accident types are being created.

Third Standard

Implementation of this amendment would not involve a significant reduction in a margin of safety. Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of these fission product barriers will not be impacted by implementation of this proposed amendment. The equipment referenced in the the proposed change to TS 3.3.2 and 3.3.5 will remain capable of performing as designed. No safety margins will be impacted.

Conclusion

Based upon the preceding discussion, Duke Energy Corporation has concluded that this proposed amendment does not involve a significant hazards consideration.

Attachment 5

Environmental Assessment/Impact Statement

The proposed license amendment request has been reviewed against the criteria of 10CFR51.22 for environmental considerations. The proposed amendment does not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor increase individual or cumulative occupational radiation exposures. Therefore, the proposed amendment meets the criteria given in 10CFR51.22(c)(9) for a categorical exclusion from the requirement for performing an Environmental Assessment/Impact Statement.